MSC Research Update
March 2019

MSC research project results in a new Cyber Security Risk Management Dashboard. MSC’s research partners from the American Bureau of Shipping (ABS) have developed a maritime cyber security risk management dashboard that can be used by maritime operators to visualize, communicate and manage risk across their assets, operations and critical suppliers. The new cyber risk platform is based on an MSC sponsored research project conducted over a two-year period in conjunction with the USCG Office of Port and Facility Compliance. Awarded in 2016, the ABS project resulted in the development of recommended risk-based performance standards for maritime vessel and facility operators, cyber security awareness training for CG Field Prevention staff, and a mapping of NIST standards and industry best practices to facility security plan requirements. To review a copy of the final ABS project report, visit: MSC Reports & Publications.

FAU Transportation Resilience Workshop to be held on March 29th. The Freight Mobility Research Institute at Florida Atlantic University (FAU) will host a one-day workshop on Supply Chain Sustainability and Transportation Resilience on March 29, 2019 at FAU’s campus in Dania Beach, FL. The event will feature MSC sponsored research being conducted to assess the consequences of hurricanes on the interconnected components of regional port networks, as well as panel discussions on strategies to enhance the transportation system resilience. To register and learn more, please visit: https://www.eventbrite.com/e/supply-chain-sustainability-and-transportation-resilience-workshop-tickets-58306139232

Meeting held with the USCG and OUP to discuss potential MSC research projects. Representatives from MSC recently met with DHS S&T’s Office of University Programs and USCG stakeholders from the Acquisition Directorate in Washington, DC to discuss maritime security research priorities and projects of interest to the USCG. Several new projects were identified and will be used to develop MSC work plans and research portfolio tailored to CG high priority needs.

MSC research leads to new AI driven sensing technology. Research that was conducted by the MSC in the areas of vessel and diver detection was used to leverage the knowledge gained for the development of a new and innovative sensor. This sensor is being used to detect the presence of destructive wood-boring insects in U.S. forests. The wood-boring insect detection system combines highly-sensitive vibration sensors, vibro-acoustic insect libraries and artificial intelligence to root out the dangerous insects hidden inside trees. The insect detection method is the most recent application leveraging principles and algorithms from the Stevens Institute of Technology’s patented passive acoustic detection technology developed for U.S. Navy and Homeland Security applications (including the detection and
identification of submersibles and small vessels in security zones and coastal borders, drone and small aircraft detection, and agricultural inspection at ports of entry).

**MSC Director awarded senior membership in the National Academy of Inventors.** MSC Director Dr. Hady Salloum has been inducted into the inaugural class of National Academy of Inventors (NAI)’s Senior Members. Dr. Salloum is among 66 academic inventors awarded this distinction. Members of the inaugural class represent research universities and governmental and non-profit research institutions. Collectively, the inaugural class of Senior Members are named inventors on over 1,100 issued U.S. patents.

**USCG signs agreement with ECSU to build capacity in aviation pilots.** MSC’s academic partners from Elizabeth City State University (ECSU), a Historically Black College and University (HBCU) have partnered with the USCG to leverage their Aviation Science bachelor’s degree program to help increase the number of prospective Coast Guard pilots through recruitment and exchanges in expertise. The degree program offers concentrations in flight education and aviation electronics among other areas. To learn more, visit https://newsroom.ecsu.edu/coast-guard-ecsu-strengthen-relationship-with-memorandum-of-agreement/

**Research in Automatic Identification System (AIS) anomaly detection selected for presentation.** Research conducted by MSC Graduate Research Assistant, Chance Petersen titled *Modeling Vessel Trajectories for Anomaly Detection Using AIS Messages* was selected for presentation at the Stevens Institute of Technology Graduate Research Conference this past February. Petersen’s research addresses the concerns of CBP and the USCG to detect anomalies in vessel traffic patterns. Petersen’s work includes probabilistic modeling, the development of machine learning algorithms and variational recurrent neural networks to reconstruct vessel tracks when gaps are detected in a vessel’s AIS transmissions.

**ITE student chapter hosts MSC Director for an invited talk.** The Institute of Transportation Engineers (ITE) student chapter at Florida Atlantic University recently hosted Professor Salloum for an invited talk on maritime security challenges and research problems addressed in the MSC. The talk was held as part of FAU’s Freight Mobility Research Institute Lecture Series.

**DHS Career Development Grant Alumni assumes General Engineer position with CBP.** Former MSC Maritime Systems Master’s Degree Fellow, Christopher Polacco has recently accepted a general engineering position with CBP Laboratories and Scientific Services Directorate at the San Francisco Laboratory. Prior to joining CBP, Chris served as a Junior Engineer at the National Urban Security Technology Laboratory where he assisted with the planning of field tests and assessments of new and emerging technologies for emergency response and law enforcement. Polacco holds both a Master of Science degree in Maritime Systems and a Bachelor of Engineering in Chemical Engineering from Stevens Institute of Technology.

**2019 COE Summit to be held July 31 – August 1, 2019.** The national network of university-led U.S. Department of Homeland Security Centers of Excellence (COEs) will hold their annual Summit from July 31 – August 1, 2019 at the George Mason University campus in Alexandria, VA. The theme of this year’s Summit event will be *Homeland Security Challenges: Evolving Threats and Dynamic Solutions*. MSC’s director of education, Beth Austin-DeFares and Stu Mackenzie, Science Manager from the Criminal Investigations and Network Analysis Center (CINA) will serve as co-chairs for the Summit Education Committee. This year’s event will include panel discussions, keynote speakers, a COE technology showcase and student activities to include a grand challenge/ hackathon, a research poster showcase and a field-visit to a DHS component facility. The Summit website and additional program details are forthcoming.
DHS I&A Corporate Security Symposium to be held at Stevens Institute of Technology on May 23, 2019. MSC is collaborating with the Office of Intelligence and Analysis (I&A) Private Sector Engagement to host the New Jersey Corporate Security Symposium at Stevens Institute of Technology on May 23, 2019. The Symposium is part of the agency's regional Corporate Security Symposia series that is designed to build public and private sector relationships and to facilitate information sharing between private sector security leaders and federal, state and local law enforcement. There is no charge to attend. Pre-registration is mandatory; walk-ins will NOT be admitted. Click here to participate: https://css.gss.anl.gov/css/seminar/newjersey2019